

Cal/Ecotox
Exposure Factors for California Newt (Taricha torosa)*

Page 1

Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Body Weight - Mean	9.7	3.37 SD	8.5 - 19.5	g	F	Adult	CA	a	1
Body Weight - Mean			10.0 - 22.0	g	F	Adult	CA	b	1
Body Weight - Mean			10.7 - 16.5	g	F	Adult	CA	c	1
Body Weight - Mean				g	M	Adult	Orange; CA	d	2
Body Weight - Mean			10.0 - 32.5	g	M	Adult	CA	e	1
Body Weight - Mean			12.0 - 20.5	g	M	Adult	CA	f	1
Body Weight - Mean			10.0 - 16.5	g	M	Adult	CA	g	1
Body Weight - Mean	10.67	3.37 SD		g	NR	Adult	Contra Costa; San Francisco; CA	h	3
Body Weight - Mean			9 - 16	g	NR	Adult	CA	i	4
Clutch or Litter Size			130-160	ova/mature ovary	F	Adult	CA	j	1
Clutch or Litter Size			18-27	eggs/mass	F	Adult	Los Angeles; CA	k	5
Clutch or Litter Size			1-4 masses of 5-30 eggs	#/clutch	F	Adult	Los Angeles; CA	l	6
Dietary Composition	see citation				NR	Adult	Los Angeles; CA	m	7
Duration of Incubation or Gestation			4 - 6	wks	NR	Embryo	Los Angeles; CA	n	8
Metabolic Rate	0.019	0.008 (2SE)		cm3	M	Adult	Lab	o	2
				O2/g/hr					
Metabolic Rate	0.054	0.004 (2SE)		cm3	M	Adult	Lab	p	2
				O2/g/hr					
Metabolic Rate	0.025	0.008 (2SE)		cm3	M	Adult	Lab	q	2
				O2/g/hr					
Metabolic Rate	0.009 (10C), 0.026 (15C), 0.027 (20C), 0.043 (25C)			cm3	M	Adult	Lab	r	9
				O2/g/hr					
Metabolic Rate	0.066 (10C), 0.093 (15C), 0.120 (20C), 0.161 (25C)			cm3	M	Adult	Lab	s	9
				O2/g/hr					
Metabolic Rate	0.016 (10C), 0.054 (15C), 0.061 (20C), 0.119 (25C)			cm3	M	Adult	Lab	t	9
				O2/g/hr					
Metabolic Rate	0.067 (10C), 0.132 (15C), 0.203 (20C), 0.287 (25C)			cm3	M	Adult	Lab	u	9
				O2/g/hr					
Metabolic Rate	194.8	10.3 SE		ul O2/g/hr	NR	Adult	Lab	v	3
Metabolic Rate	117.9	6.6 SE		ul O2/g/hr	NR	Adult	Lab	w	3
Metabolic Rate	83.2	4.9 SE		ul O2/g/hr	NR	Adult	Lab	x	3
Metabolic Rate	118.3	8.3 SE		ul O2/g/hr	NR	Adult	Lab	y	3
Metabolic Rate	46.1	5.0 SE		ul O2/g/hr	NR	Adult	Lab	z	3
Metabolic Rate	66.7	4.9 SE		ul O2/g/hr	NR	Adult	Lab	aa	3
Metabolic Rate	132.9	7.7 SE		ul O2/g/hr	NR	NR	Lab	ab	10
Population Density			0.51 - 0.84	#/10 m2	NR	Adult	Los Angeles; CA	ac	11
Population Density	2.6			#/10 m2	NR	Adult	Los Angeles; CA	ad	8
Population Density			0.67 - 1.84	#/10m2	NR	Adult	Los Angeles; CA	ae	12
Population Density			0 - 0.22	#/10 m2	NR	Adult	Los Angeles; CA	af	12
Population Density			0.6 - 1.4	#/ 10 m2	NR	Embryo	Los Angeles; CA	ag	11
Population Density			1.44 - 3.0	# larvae/m2	B	Juvenile	Los Angeles; CA	ah	7
Population Density			6.3 - 23.7	#/m2	NR	Juvenile	Los Angeles; CA	ai	8
Time of Hatching or Parturition	see citation				B	Embryo	Los Angeles; CA	aj	6
Time of Mating/ Laying	Dec. - Feb. and Mar. - May				B	Adult	Santa Clara; CA	ak	13

Exposure Factors for California Newt (*Taricha torosa*)

Page 2

Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Time of Mating/ Laying	Dec. - Feb.				B	Adult	CA	al	1
Time of Mating/ Laying	review				B	Adult		am	14
Time of Mating/ Laying	Apr. - May				B	Adult	Los Angeles; CA	an	6

Notes

- a range of means from 5 sampling dates; N=2-10/sampling date; Condition=mature gonads; Oct.-Dec.; Palo Alto; see citation for body length and ovarian, fat body and body weight data
- b range of means for 8 sampling dates; N=1-6/sampling date; Condition=post-spawning; Feb.-July; Palo Alto; see citation for body length and ovarian, fat body and body weight data
- c range of means for 5 sampling dates; N=2-6/sampling date; Condition=unmatured gonads; Oct.-Dec.; Palo Alto; see citation for body length and ovarian, fat body and body weight data
- d N=NR; spring-autumn; Trabuco, Holy Jim and Harding Canyons
- e range of means for 8 sampling dates; N=1-10/sampling date; Condition=sperm evacuated testes; Jan.-July; Palo Alto; see citation for testes weight, fat body weight and body length data
- f range of means from 5 sampling dates; N=2-10/sampling date; Condition=mature gonads; Oct.-Dec.; Palo Alto; see citation for testes weight, fat body weight and body length data
- g range of means from 5 sampling dates; N=4-7/sampling date; Condition=unmatured gonads; Oct.-Dec.; Palo Alto; see citation for testes weight, fat body weight and body length data
- h N=NR; Jan.-Mar.
- i N=NR; Berkeley
- j N=NR; Palo Alto
- k N=6 egg masses; Apr. - May; Sycamore Canyon Creek, San Gabriel Mountains
- l N=NR; Santa Monica Mountains
- m figure of % of stomachs containing prey items over several yrs; N=17-52; spring and summer; Cold Creek and Trancas Creek, Santa Monica Mountains
- n time from egg to hatching; N=NR; Santa Monica Mountains
- o aquatic respiration (oxygen consumption) at 15C; N=7; Condition=aquatic newts
- p aerial respiration (oxygen consumption) at 15C; N=12; Condition=aquatic newts
- q aerial respiration (oxygen consumption) at 15C; N=12; Condition=terrestrial newts
- r resting oxygen consumption measured at various temperatures (10-25C); N=NR; Condition=terrestrial newt
- s active oxygen consumption measured at various temperatures (10-25C); N=NR; Condition=terrestrial newt
- t resting oxygen consumption measured at various temperatures (10-25C); N=NR; Condition=aquatic newt
- u active oxygen consumption measured at various temperatures (10-25C); N=NR; Condition=aquatic newt
- v maximum oxygen consumption during activity measured at 25C on animals acclimated at 12C; N=5-8
- w maximum oxygen consumption during activity measured at 25C on animals acclimated at 22C; N=5-8
- x maximum oxygen consumption during activity measured at 15C on animals acclimated at 22C; N=5-8
- y maximum oxygen consumption during activity measured at 15C on animals acclimated at 12C; N=5-8
- z maximum oxygen consumption during activity measured at 5C on animals acclimated at 12C; N=5-8; see citation for figures of standard metabolic rate
- aa maximum oxygen consumption during activity measured at 5C on animals acclimated at 22C; N=5-8
- ab mean oxygen consumption following activity, measured at 25C; N=8; average body weight, 10.22 g
- ac range of mean densities measured each yr for 4 yrs; N=4 yearly surveys; Mar.-May; 750m stretch of Cold Creek, Santa Monica Mountains
- ad N=NR; June; Santa Monica Mountains
- ae range of mean density estimates for six pools without crayfish over two time periods; N=NR; May - June; Trancas Creek, Santa Monica Mountains
- af range of mean density estimates for six pools with crayfish over two time periods; N=NR; April - May; Trancas Creek, Santa Monica Mountains
- ag range of mean densities of egg masses measured each yr for 4 yrs; N=4 yearly surveys; Mar.-May; 750m stretch of Cold Creek, Santa Monica Mountains
- ah range of mean larval density estimates over 2 yrs; N=NR; Cold Creek, Santa Monica Mountains
- ai range of larval densities in pools with or without adults during June-July; N=NR; Age=larvae; June-July; Santa Monica Mountains
- aj figure of mean duration from fertilization to hatching in field enclosures; N=8 replicates of 150 (frogs) or 16-12 (newts) embryos; Santa Monica Mountains
- ak time of breeding; N=NR
- al time of breeding; N=NR; Palo Alto
- am N=NR
- an time of breeding; N=NR; Santa Monica Mountains

References

1 Miller, Malcom R. and Marilyn E. Robbins. 1954. The reproductive cycle in *Taricha torosa* (*Triturus torosus*). J. Exp. Zool. 125:415-445.

2 Harlow, Henry J. 1977. Seasonal oxygen metabolism and cutaneous osmoregulation in the California newt, *Taricha torosa*. *Physiol. Zool.* 50(3):231-236.

3 Feder, Martin E. 1978. Environmental variability and thermal acclimation in neotropical and temperate zone Salamanders. *Physiol. Zool.* 51:7-16.

4 Wakeman, John M. and Gordon R. Ultsch. 1975. The effects of dissolved O₂ and CO₂ on metabolism and gas-exchange partitioning in aquatic salamanders. *Physiol. Zool.* 48(4):348-359.

5 Brame, Arden H. 1968. The number of egg masses and eggs laid by the California newt, *Taricha torosa*. *J. Herpetol.* 2:169-170.

6 Anzalone, Christopher R., Lee B. Kats and Malcolm S. Gordon. 1998. Effects of solar UV-B radiation on embryonic development in *Hyla cadaverina*, *Hyla regilla* and *Taricha torosa*. *Conserv. Biol.* 12:646-653.

7 Kerby, J. Lawrence and Lee B. Kats. 1998. Modified interactions between salamander life stages caused by wildfire-induced sedimentation. *Ecology.* 79:740-745.

8 Kats, Lee B., Jennifer A. Breeding and Kimberly M. Hanson. 1994. Ontogenetic changes in California newts (*Taricha torosa*) in response to chemical cues from conspecific predators. *J. North Am. Benthol. Soc.* 13(2):321-325.

9 Harlow, Henry J. 1978. Seasonal aerobic and anaerobic metabolism at rest and during activity in the salamander, *Taricha torosa*. *Comp. Biochem. Physiol., A , Comp. Physiol.* 61:177-182.

10 Feder, Martin E. 1977. Oxygen consumption and activity in salamanders: Effect of body size and lunglessness. *J. Exp. Zool.* 202:403-414.

11 Gamradt, Seth C. and Lee B. Kats. 1997. Impact of chaparral wildfire-induced sedimentation on oviposition of stream-breeding California newts (*Taricha torosa*). *Oecologia.* 110:546-549.

12 Gamradt, Seth C., Lee B. Kats and Christopher B. Anzalone. 1997. Aggression by non-native crayfish deters breeding in California newts. *Conserv. Biol.* 11:793-796.

13 Twitty, Victor Chandler. 1942. The species of Californian *Triturus*. *Copeia.* 1942(2):64-75.

14 Nussbaum, Ronald A. and Edmund D. Brodie, Jr. 1981. *Taricha tarosa* (Rathke), California newt. *Cat. Am. Amphib. Reptil.* 273:1-4.

*Cal/EPA, OEHHA and the University of California Regents are not responsible for damages of any kind resulting from the use of or reliance on information in this report. Users are encouraged to consult the original data. Updated: February 1999.